

## **CLAIMS**

What is claimed is:

1. A milling cutting tool assembly comprising:

an adapter having an adapter central axis and comprising:

adapter first and second sides;

a centrally located male locating member projecting from the adapter first side and provided with a threaded bore in a central portion thereof; and

a plurality of circumferentially spaced-apart drive pins projecting from the adapter first side; and

a cutter body having a cutter central axis, and comprising:

cutter body first and second sides;

a centrally located female locating member formed in the cutter body first side;

a plurality of circumferentially spaced-apart drive grooves formed in the cutter body first side, each drive groove having an insertion portion connected to a retaining portion; and

a throughbore extending along the cutter central axis and communicating with the female locating member; and

a bolt occupying the throughbore;

wherein:

the assembly is adjustable from a first position in which the adapter and the cutter body are separated from one another, to a second position in which the male locating member is nested in the female locating member and at least two drive pins are positioned in a corresponding number of respective drive grooves' insertion portions;

the assembly is further adjustable from said second position to a third position in

which the at least two drive pins are positioned in their respective drive grooves' retaining portions, upon rotation of the cutter body relative to the adapter; and

when the assembly is in the third position, the cutter body is securable to the adapter upon insertion of the bolt into the threaded bore of the male locating member, and without tightening the drive pins in the retaining portions of the grooves.

2. The assembly according to claim 1, further comprising:  
a ring mounted proximate to the second side of the cutter body and configured to retain the bolt in the throughbore, when the cutter body is separated from the adapter.
3. The assembly according to claim 2, wherein, when the cutter body is separated from the adapter, and the cutter body first side faces upwards, a threaded end of the bolt does not project from the throughbore into the female locating member.
4. The assembly according to claim 1, wherein the cutter body comprises a base member spaced apart from a cutting head by a neck portion.
5. The assembly according to claim 1, wherein each groove is provided with a bottom surface that prevents access to heads of the drive pins, when the assembly is in either the second or third position.
6. The assembly according to claim 1, wherein, when the cutter body is secured to the adapter, heads of the drive pins are spaced apart from undersides of back walls of the retaining portions of the grooves, and also from bottom surfaces of the grooves.
7. The assembly according to claim 1, wherein the male locating member projects from a recess formed in a central portion of the adapter first side.
8. The assembly according to claim 1, wherein a diameter of the male locating

member, at its base, is between 30 – 50% of the diameter of the adapter.

9. The assembly according to claim 1, wherein a height of the male locating member is between 10 –20% of the diameter of the adapter.

10. The assembly according to claim 1, wherein no more than four drive pins and four drive grooves are provided.

11. The assembly according to claim 1, wherein the adapter second side is provided with a keyway and a hub that are configured to mate with a spindle.

12. A method for assembling a milling cutting tool comprising an adapter and a cutter body,

wherein the adapter has previously been mounted in an inverted position, the adapter having a male locating member provided with a threaded bore in a central portion thereof, and a plurality of circumferentially spaced-apart drive pins, and

wherein the cutter body is provided with a female locating member, a plurality of circumferentially spaced-apart drive grooves, each drive groove having an insertion portion connected to a retaining portion, and a throughbore communicating with the female locating member;

the method comprising:

(a) raising the cutter body towards the adapter with the female locating member and drive grooves facing upwards, until the drive pins enter the insertion portions of the drive grooves and the male locating member enters the female locating member;

(b) rotating the cutter body such that the drive pins enter the retaining portions of the drive grooves;

(c) releasing the cutter body such that it is suspended from the adapter by virtue of the retaining portions of the drive grooves being supported by the drive pins; and

(d) inserting a bolt into the threaded bore of the male locating member,

thereby securing the cutter body to the adapter without tightening the drive pins in the retaining portions.

14. The method according to claim 13, wherein each of steps (a) – (d) are performed by a human operator using one hand.

15. The method according to claim 13, comprising modifying the cutter body so as to retain the bolt in the throughbore, during step (a).

16. The method according to claim 15, comprising providing a bolt that is sufficiently short such that an end of the bolt does not project into the female locating member, during step (a).

17. A milling cutting tool comprising:

an adapter having an adapter central axis and comprising:

adapter first and second sides;

a centrally located male locating member projecting from the adapter first side and provided with a threaded bore in a central portion thereof; and

a plurality of circumferentially spaced-apart drive pins projecting from the adapter first side; and

a cutter body having a cutter central axis and comprising:

cutter body first and second sides;

a centrally located female locating member formed in the cutter body first side;

a plurality of circumferentially spaced-apart drive grooves formed in the cutter body first side, each drive groove having an insertion portion connected to a retaining portion;

a throughbore extending along the cutter central axis and communicating with the female locating member; and

a bolt inserted into the threaded bore of the male locating member to thereby secure the cutter body to the adapter; and

wherein:

the male locating member is nested in the female locating member; and

the drive pins are positioned in the retaining portions of the drive grooves without being in tight engagement therewith.

18. The tool according to claim 17, further comprising:

a ring mounted proximate to the second side of the cutter body and configured to retain the bolt in the throughbore.

19. The tool according to claim 17 wherein the cutter body comprises a base member spaced apart from a cutting head by a neck portion.

20. The tool according to claim 17, wherein each groove is provided with a bottom surface that prevents access to heads of the drive pins.

21. The tool according to claim 17, wherein, heads of the drive pins are spaced apart from undersides of back walls of the retaining portions of the grooves, and also from bottom surfaces of the grooves.

22. The tool according to claim 17, wherein the male locating member projects from a recess formed in a central portion of the adapter first side.

23. The tool according to claim 17, wherein a diameter of the male locating member, at its base, is between 30 – 50% of the diameter of the adapter.

24. The tool according to claim 17 wherein a height of the male locating member is between 10 –20% of the diameter of the adapter.

25. The tool according to claim 17 wherein no more than four drive pins and four drive grooves are provided.
26. The tool according to claim 17, wherein the adapter second side is provided with a keyway and a hub that are configured to mate with a spindle.
27. A cutter body having a cutter central axis and comprising:  
cutter body first and second sides;  
a centrally located female locating member formed in the cutter body first side;  
a plurality of circumferentially spaced-apart drive grooves formed in the cutter body first side, each drive groove having an insertion portion connected to a retaining portion and a bottom surface;  
a throughbore extending along the cutter central axis and communicating with the female locating member; and  
a bolt loosely retained in the throughbore.
28. The cutter body according to claim 27, further comprising a ring configured to retain the bolt in the throughbore.
29. The cutter body according to claim 27, wherein, when the cutter body is oriented with the cutter body first side facing upwards, a threaded end of the bolt does not project from the throughbore into the female locating member.
30. The cutter body according to claim 27, comprising a base member spaced apart from a cutting head by a neck portion.
31. A set of at least four milling cutting tool components including at least first and

second adapters, a left-handed cutter body and a right-handed cutter body; wherein:

the first adapter has a conically tapered male locating member provided with a threaded bore in a central portion thereof, and a plurality of circumferentially spaced-apart drive pins arranged in a first set of locations;

the left-handed cutter body has a conically tapered female locating member, a throughbore that passes through the female locating member, and a plurality of circumferentially spaced-apart drive grooves, each drive groove having an insertion portion connected to a retaining portion and a bottom surface, the insertion portions of the left-handed cutter body positioned to mate with the drive pins of the first adapter; and

the second adapter has a conically tapered male locating member provided with a threaded bore in a central portion thereof, and a plurality of circumferentially spaced-apart drive pins arranged in a second set of locations that is different from the first set of locations;

the right-handed cutter body has a conically tapered female locating member, a throughbore that passes through the female locating member, and a plurality of circumferentially spaced-apart drive grooves, each drive groove having an insertion portion connected to a retaining portion and a bottom surface, the insertion portions of the right-handed cutter body positioned to mate with the drive pins of the second adapter.